KENWOOD AUTOMATIC TURNTABLES WITH TONEARMS

KD-3033/2033

Outstanding performance plus reliability

These two automatic turntables with tonearms feature the traditional Kenwood quality and reliability stemming from its extensive experience and knowhow, translated into features that provide truly outstanding performance in high fidelity playback of stereo records. Their powerful synchronous motors provide extremely low wow and flutter ratings plus freedom from the effects of minor line voltage fluctuations; they have heavy platters finished and balanced to precision standards, driven by polyurethane rubber belts fabricated of specially selected material and polished on both sides to extremely high standards of precision, additional factors that virtually eliminate rumble and also contribute in a big way to their low wow and flutter ratings. The turntables are equipped with specially designed mounts that minimize acoustic feedback. Their precision tonearms, free of resonance, are designed to derive the most out of the superb moving magnet type cartridges fitted.

The net result is superb tonal quality, with virtual elimination of muddiness or wavering of signals, plus high signal-to-noise ratios.

Both feature handsome walnut finish bases with translucent dust covers, to make them welcome additions to the decor of the room.

For the enthusiast who wants the best in belt-drive players, the KD–3033 is the obvious choice; for the enthusiast who wants optimum performance at minimum outlay, the KD–2033 will provide standards of performance easily on a par with far costlier units.

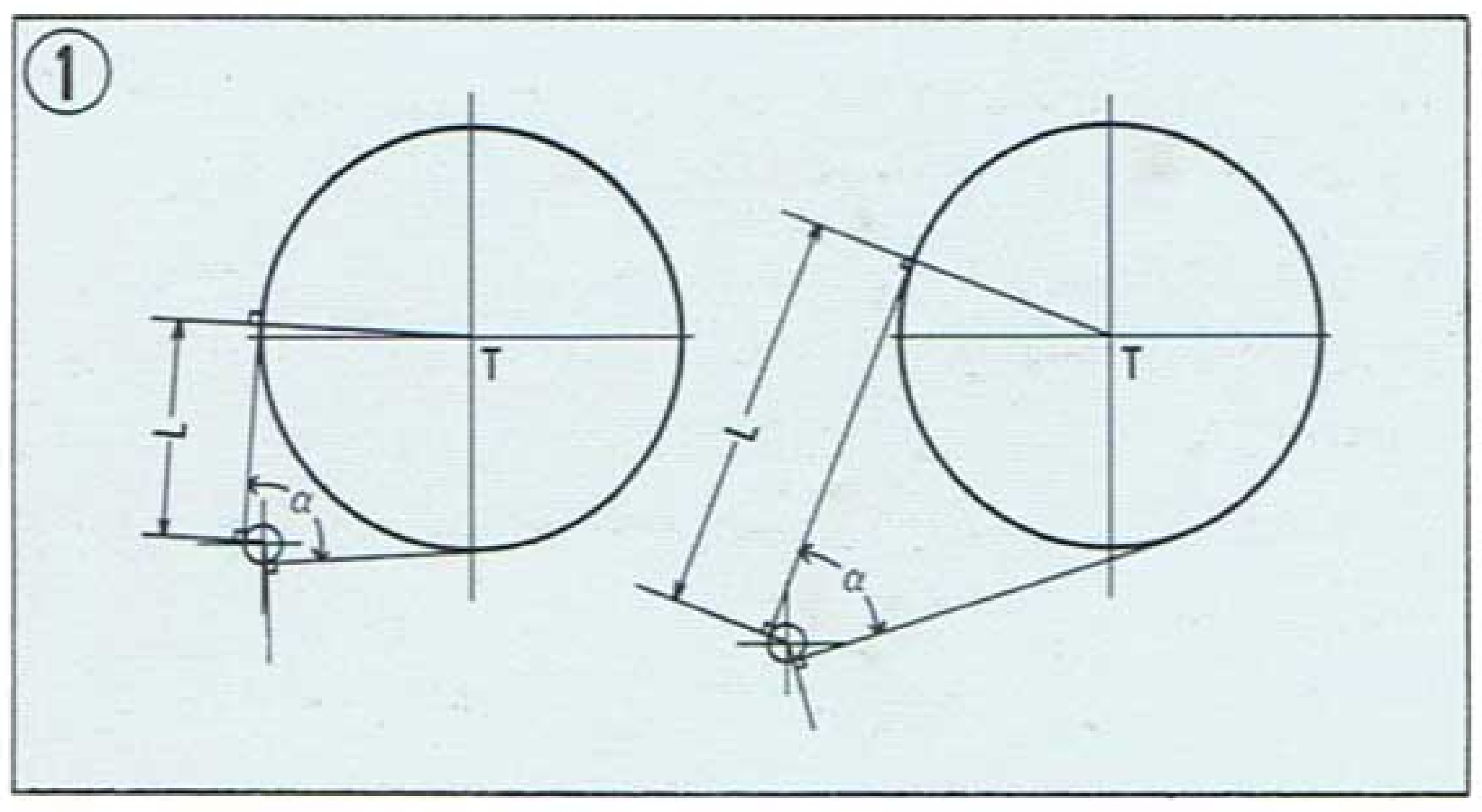
Motor

The AC synchronous motor provides stable performance virtually unaffected by minor line voltage fluctuations. In particular, through special means adopted to obtain even magnetic flux distribution in the magnet, vibrations are drastically lower than conventional synchronous motors.

In addition to the inherently quiet operation of the synchronous motor, the low vibration design prevents rumble, while the low flux leakage design minimizes hum at multiples of the line frequency.

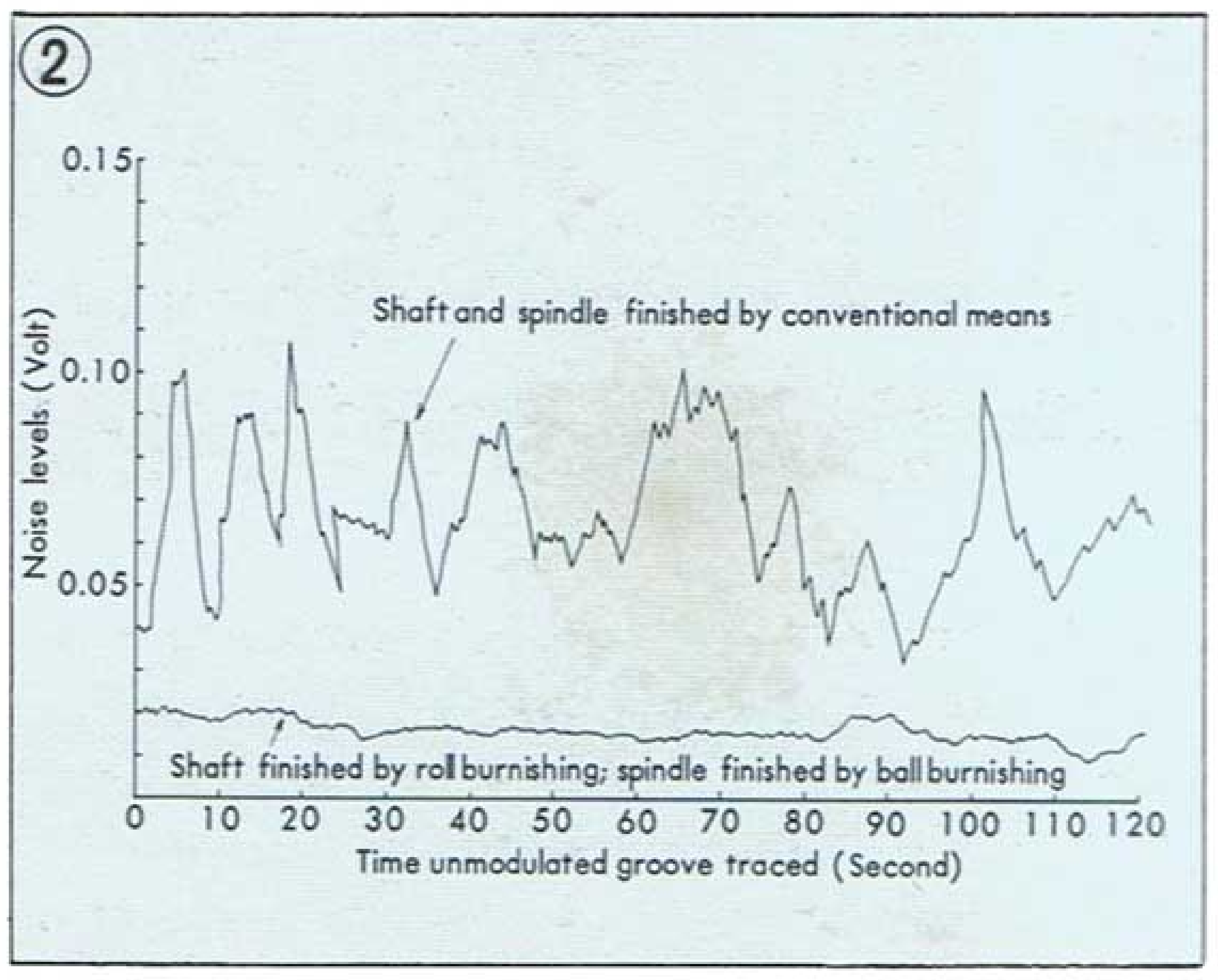
Belt

In a belt-drive turntable, the belt naturally has a major effect upon performance, particularly wow and flutter ratings. After careful research, a special polyurethane rubber material impervious to the passage of years was chosen and finished to a thickness of 0.5mm, plus or minus only 0.02mm. The relative positioning of the drive pulley and turntable platter was modified to achieve lasting performance without deterioration. Wow and flutter attributable to the belt are extremely minimal. The farther the drive pulley is moved from the turntable platter, the more the drive belt is deformed. On the other hand, by moving it in closer to the platter, there is less deformation of the belt. Less deformation means less wear in the form of belt fatigue, for greater stability in performance and longer life. In the illustration above, the angle at which the belt goes around the drive pulley is expressed by "α". The larger the value of "α" expressed in degrees, the better.



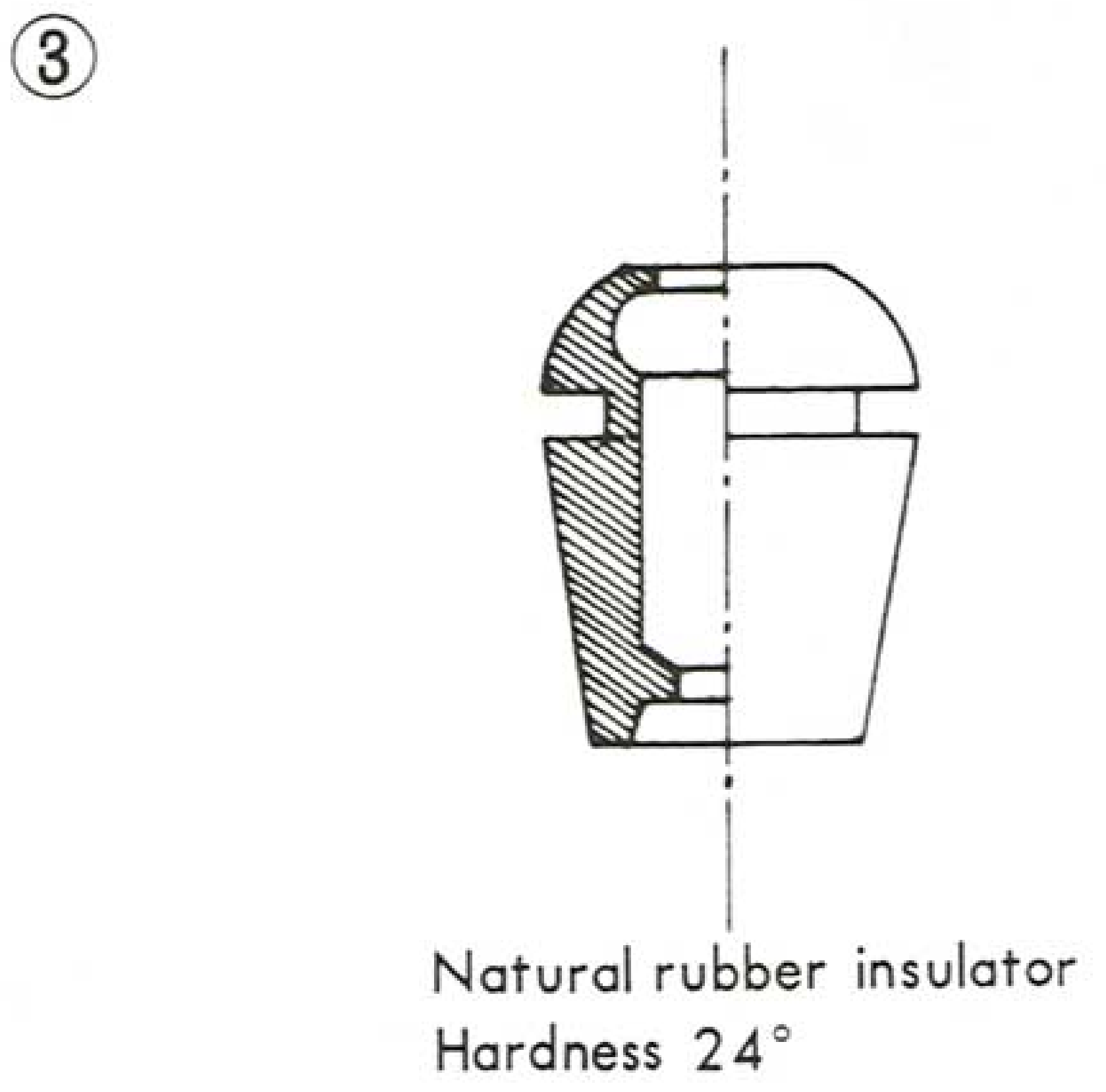
Pulley, center spindle

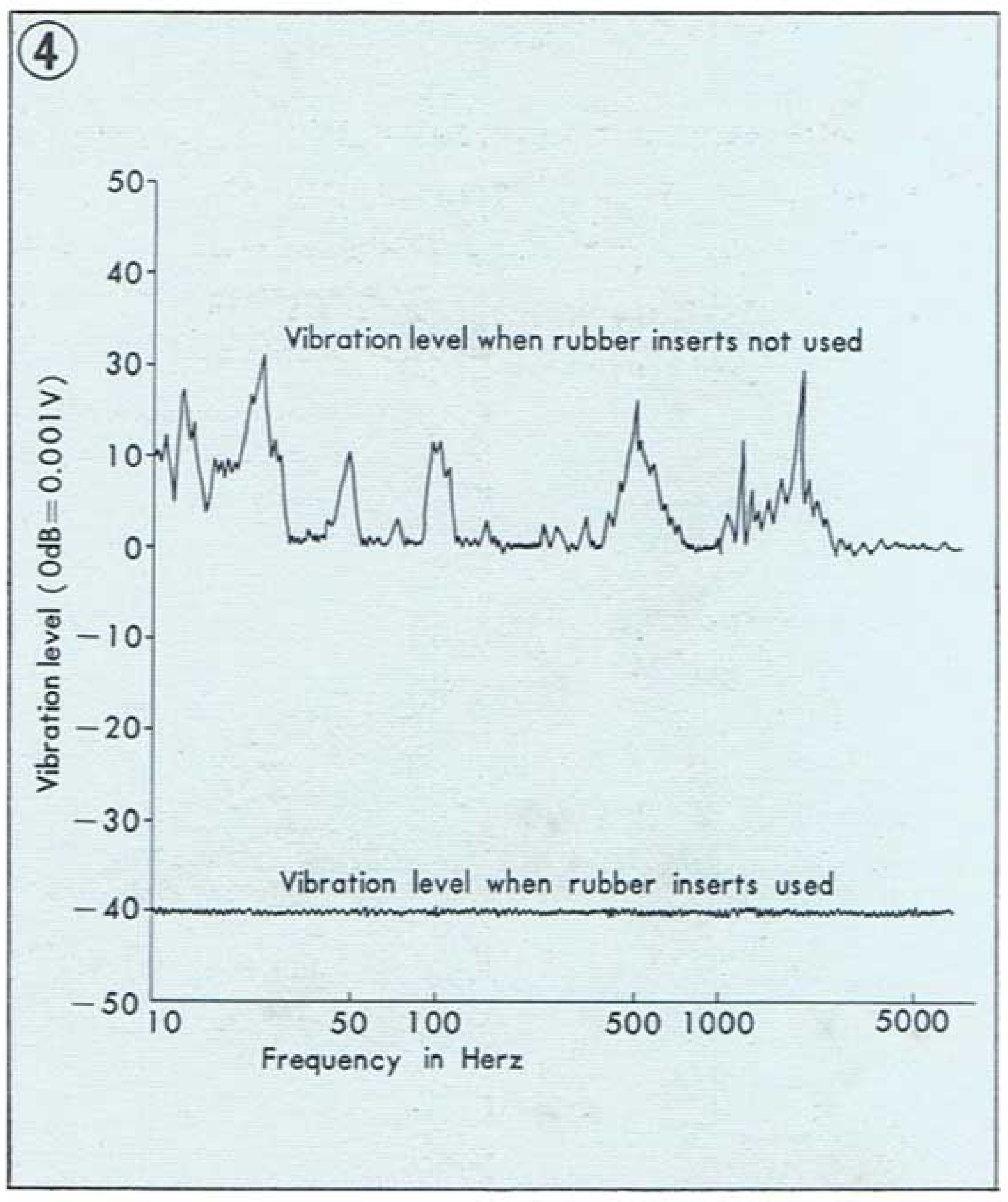
If the standards of precision of the drive components such as the pulley or the center spindle are low, spurious vibrations are caused to result in wow and flutter. To eliminate this risk, the spindle and the spindle receptacle bearing surfaces are finished by burnishing in addition to conventional machining, the spindle by roll burnishing and the spindle receptacle bearing surfaces by ball burnishing. These measures assure a high precision mirror-finish to these components, to result in a marked reduction in noise level as compared to a turntable fitted with components finished by conventional machining only, as shown in Figure 2 .



Motor support

The motor, an extremely low vibration unit to begin with, is supported by special vibration damping rubber mounts as shown in Figure 3 , to achieve the extremely low vibration levels shown in Figure 4-b . It should be noted that there is absolutely no rumble in the low ranges. Figure 4-a shows the vibrations resulting when the rubber dampers were not used. The motor was tested off a 50Hz AC power line, and the 50Hz and 100Hz peaks are clearly discernible.





Acoustic feedback prevention

If the base and/or cover of a turntable should have resonance frequencies, when strong signals of the same frequencies emanate from the speakers and strike these components, acoustic feedback is liable to occur. Therefore, no matter how good the theoretical performance of a turntable may be, if its performance should deteriorate when it is placed in actual use because of resonance from such acoustic feedback, all its fine theoretical performance will be to naught.

Kenwood conducted exhaustive research and testing in designing the base and cover for the KD-2033 / 3033 in order to prevent such acoustic feedback, and finally came up with a resonance-free base and cover with flat frequency response as shown in Figure 5 .

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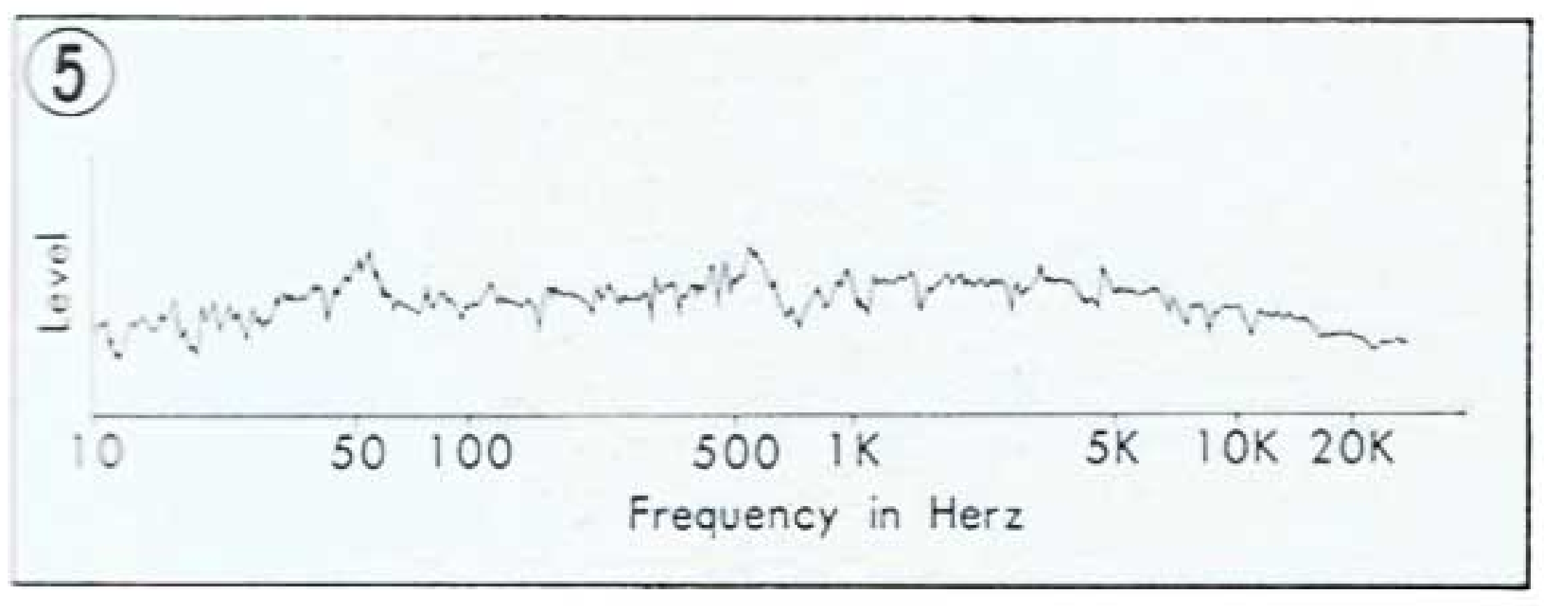

As for vibrations transmitted via the floor and the surface the turntable is placed on, special insulators as shown in Figure 6 are employed to prevent such vibrations from adversely affecting the performance of the turntable.

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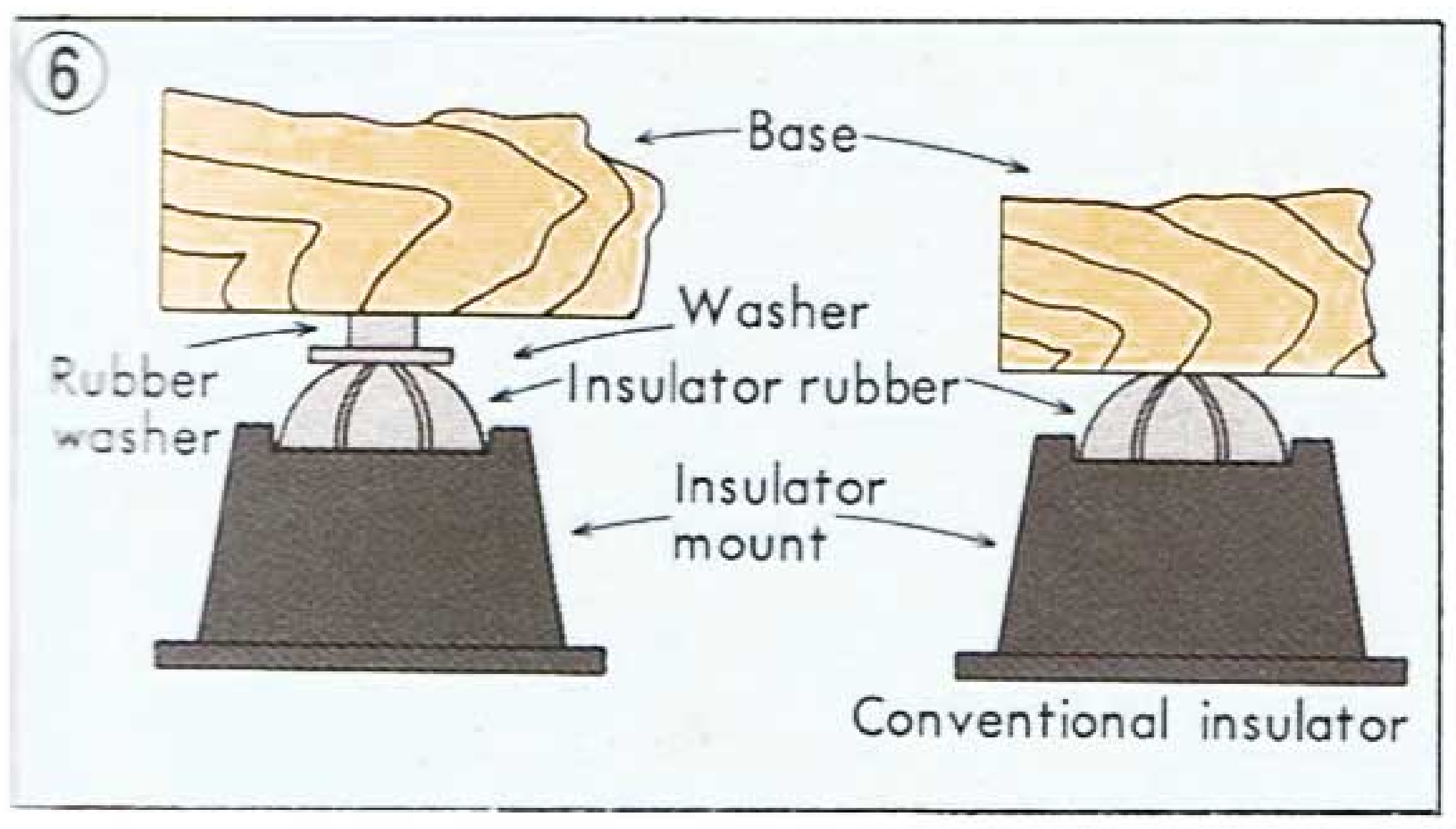

The resonance frequencies of the insulators should, ideally speaking, be below the lower limit of the audio spectrum, and towards this end, soft rubber insulators are the best. However, with soft rubber, the insulators are liable to be squashed to increase the contact area between the insulators and the base, which would then mean increased transmission of vibrations. The relationship between the contact area and the transmission of vibrations is shown in Figure 7 . To prevent this from happening, a rubber washer is inserted as shown in Figure 6 , so that even if the rubber vibration damper section should be deformed, the contact area will not increase. This minimizes the transmission of vibrations.

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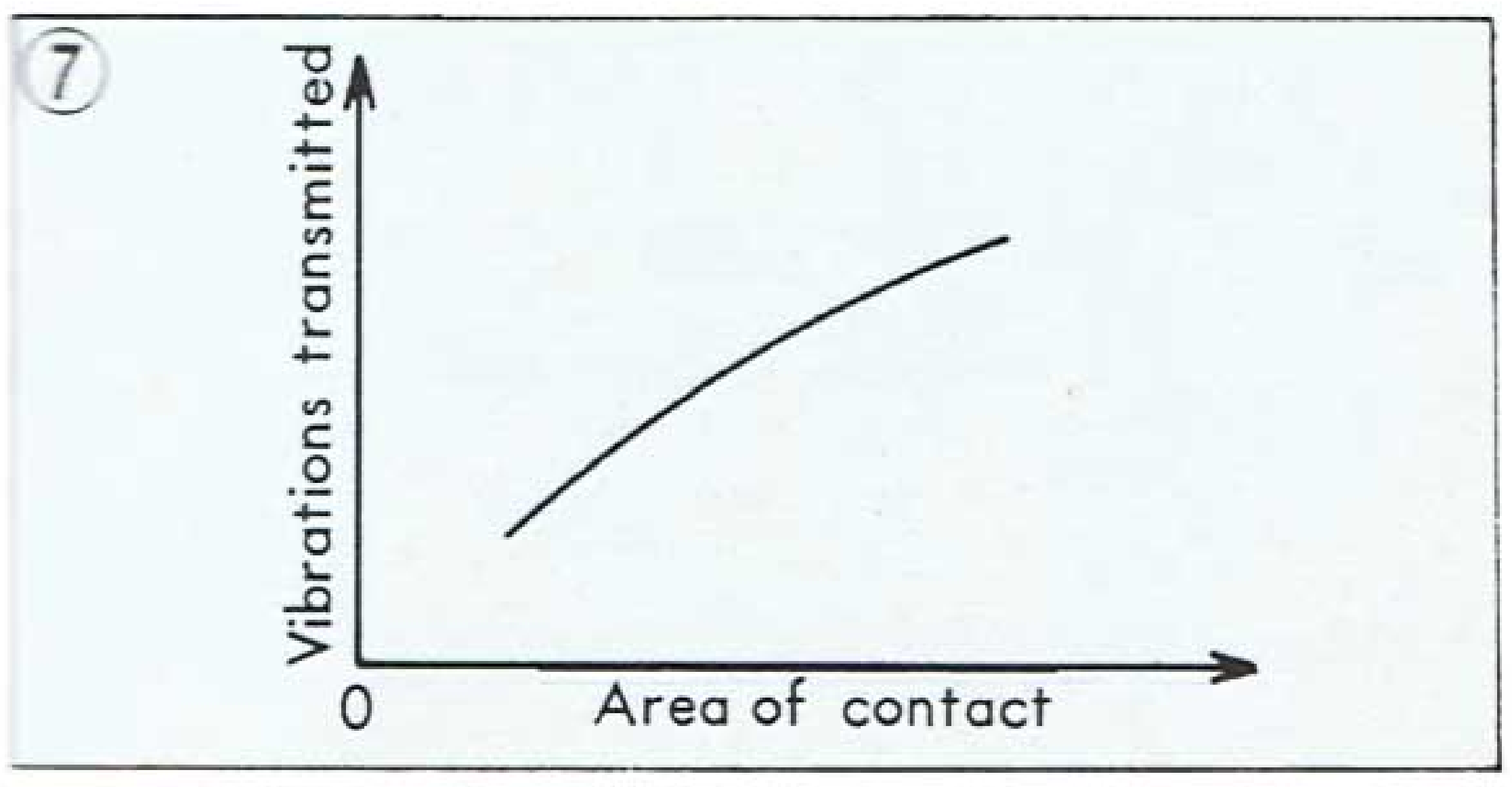
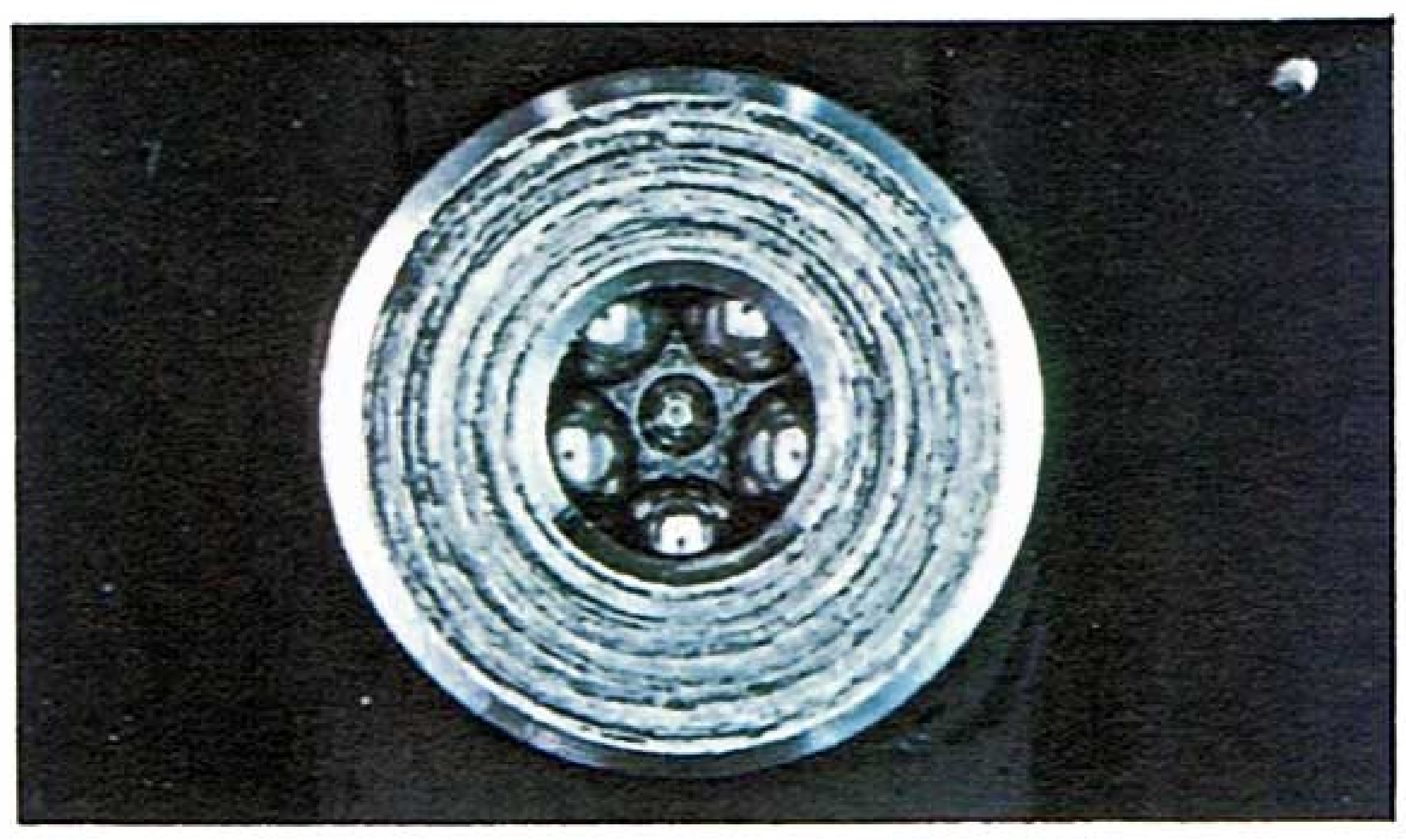


Resonance-free, high sensitivity tonearm.

Bearings and pipe arm

The tonearm uses specially designed precision ball bearings for high compliance and outstanding tracking capability that enable it to easily track records with extremely wide dynamic range.

The conventional pivot employs a ball bearing with four 1mm diameter balls. However, this tonearm has a special pivot ball bearing using five 0.9mm diameter balls.



This serves to virtually eliminate vertical looseness and do away with deterioration of sensitivity from this cause. Also, a 'pivot cushion' which envelops the around pivot assembly and isolates it from the rest of the turntable is fitted to improve the signal-to-noise ratio and reduce the risk of acoustic feedback.

The tonearm has a low resonance point at 8Hz, and this enables it to give full play to the excellent characteristics of the cartridge.

Head shell

To improve tracking, it is necessary to reduce the effective mass of the tonearm as much as possible. Towards this end, it becomes essential to reduce the mass of the head shell at the tip of the tonearm. At the other extreme, however, there are also instances of head shells that are physically weak and also susceptible to resonance as a result of having reduced the mass to an excessive degree. The head shell fitted on this tonearm is a universal type fabricated of aluminum alloy that provides both low mass, physical ruggedness, and is also free of resonance. It is a plug-in type conforming to EIA standards, and can be replaced easily with other head shells conforming to these standards.

Records, in many instances, are warped and the major effects of such warpage show up in the form of unwanted signals with frequencies of 5Hz or less. Meanwhile, the record grooves contain music signals from 17Hz upwards. Accordingly, the low frequency resonance of the head shell should be above the warpage frequency of the record and below the minimum frequency of the music. In the case of this tonearm, it has been set at 8Hz.

Reduced equivalent mass also means improved tracking, initial sensitivity and performance for high compliance cartridges. It is also for these reasons that this tonearm has a reduced mass which provides ample damping of resonance yet is still drastically reduced as compared to tonearms manufactured heretofore. The net result is superb overall frequency response as shown in Figure 10 .

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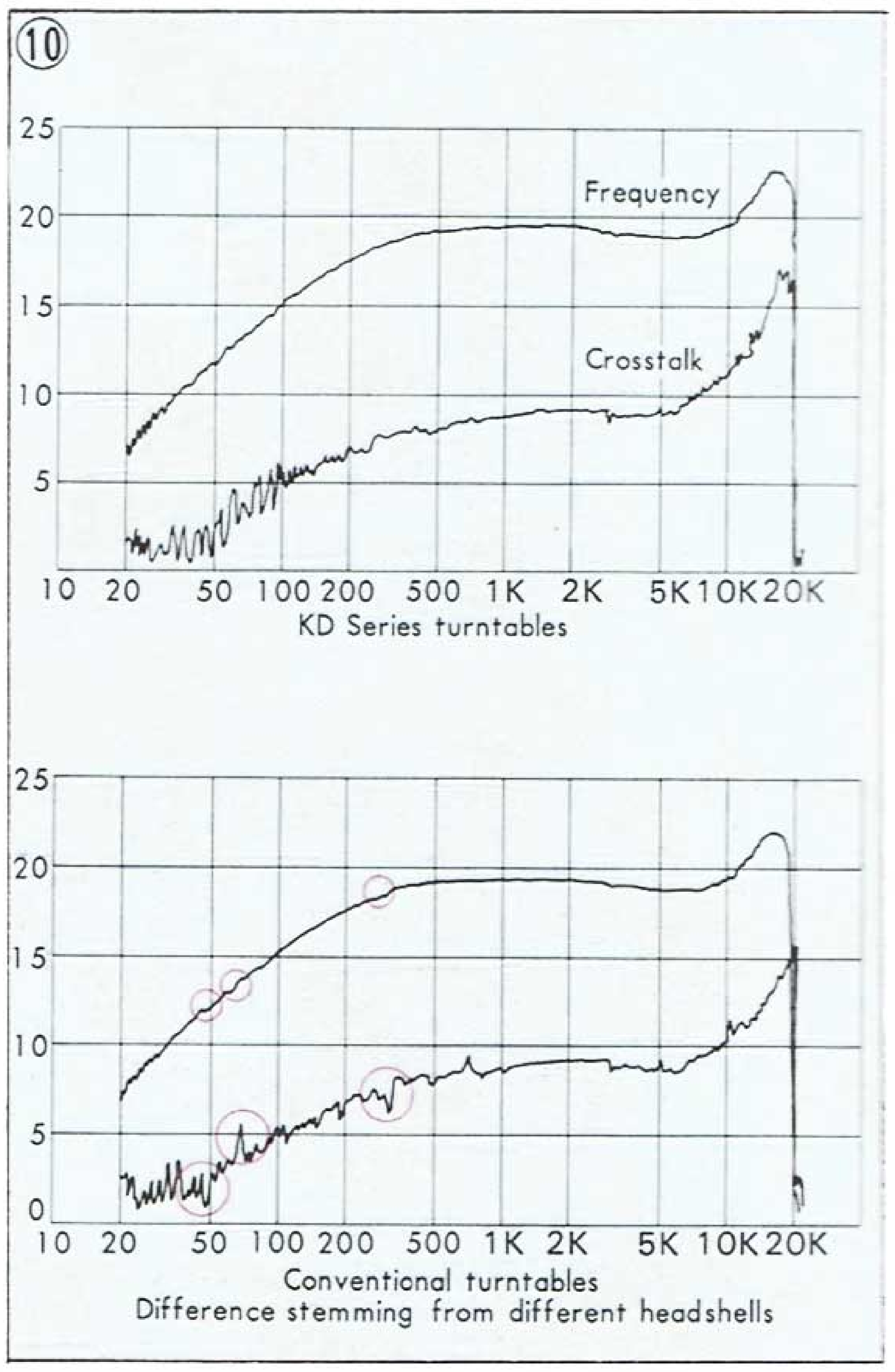

Anti-skating devices

Because of the off-set angle of the tonearm, an inside force that draws the tonearm inwards towards the center of the turntable is generated. When this happens, the tracking force applying on the inner lands of the grooves which contain the right channel signal increases, while that applying on the outer, or left channel, lands decreases, resulting in an imbalance in output levels, possible skating of the stylus, and uneven wear of the record lands.

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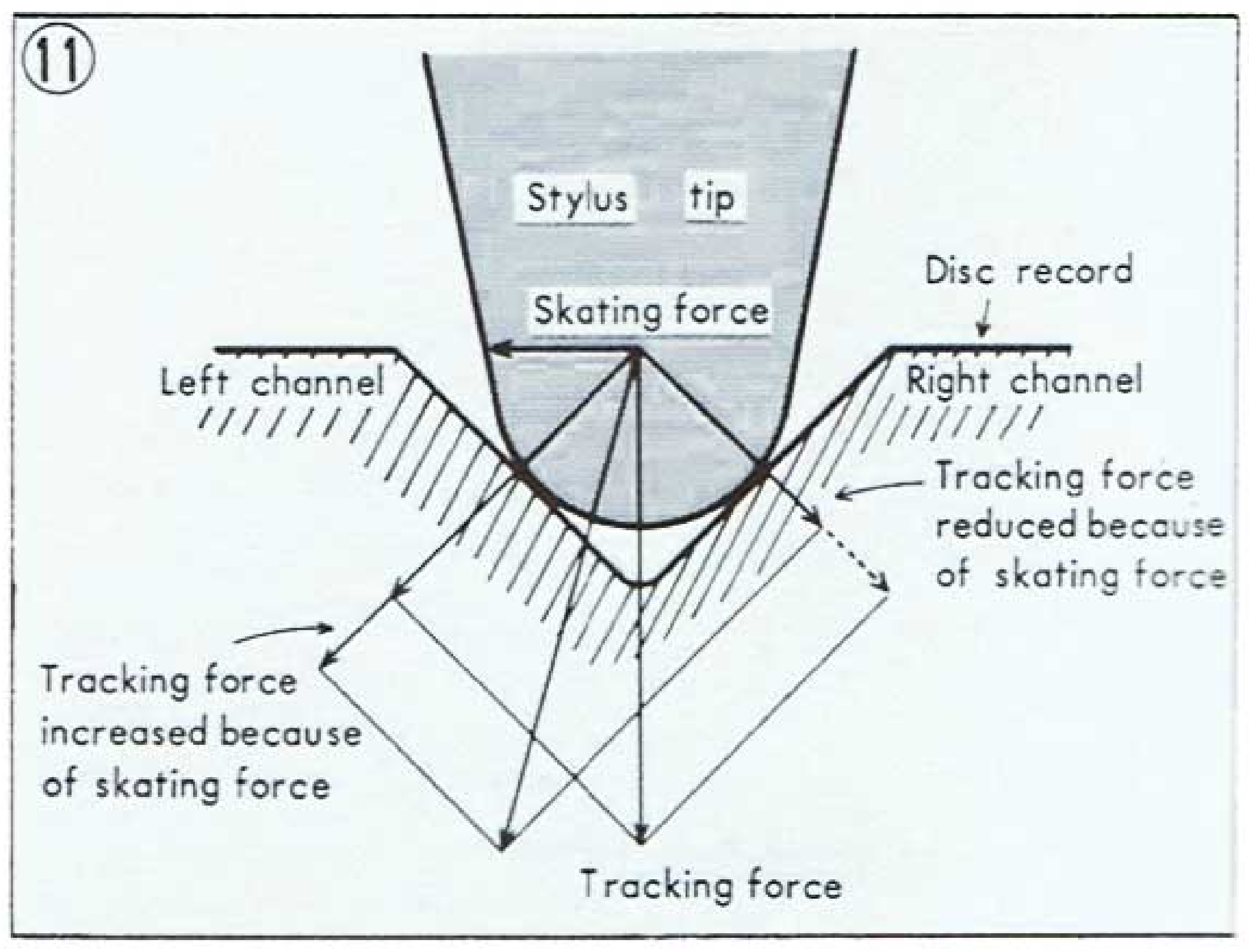
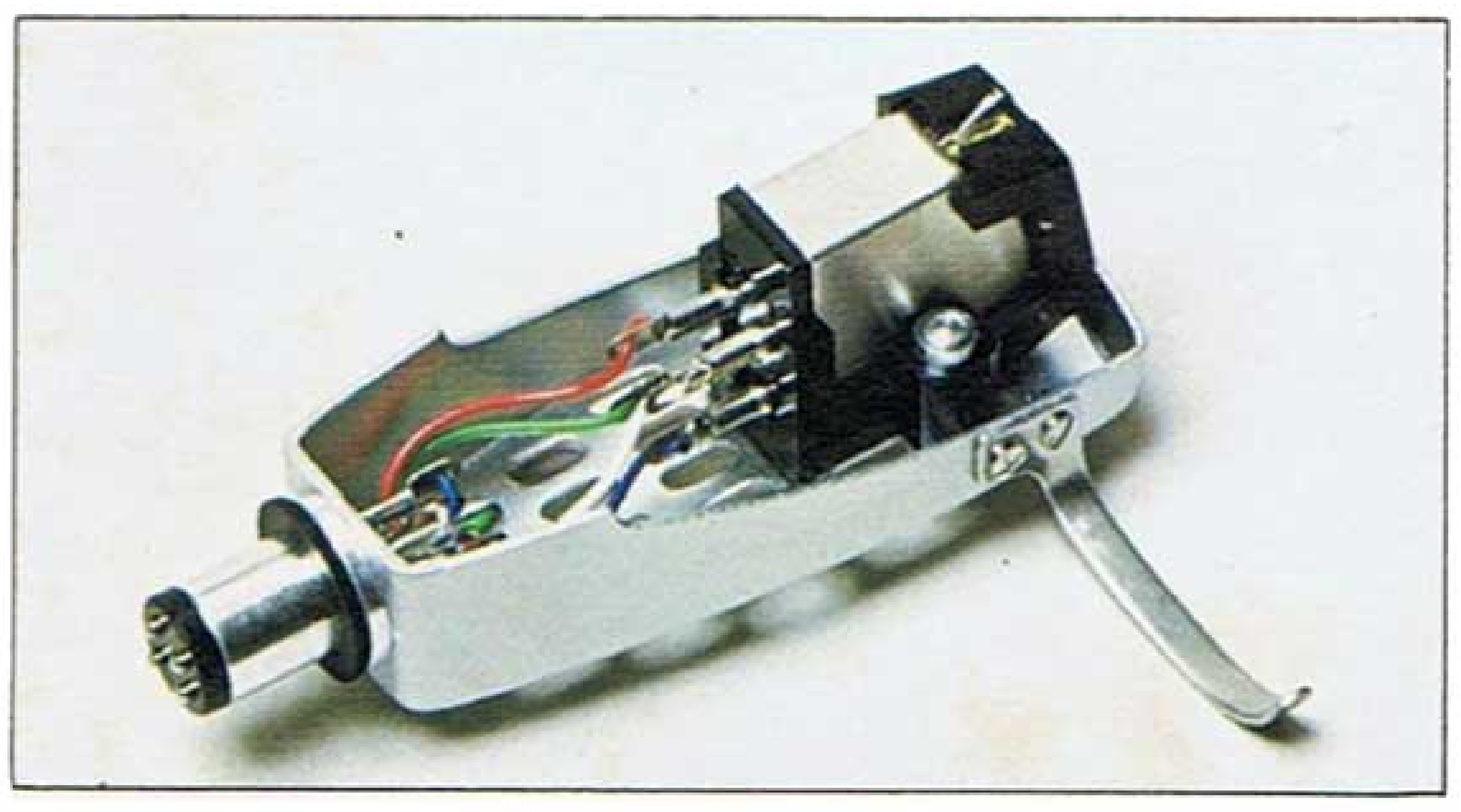
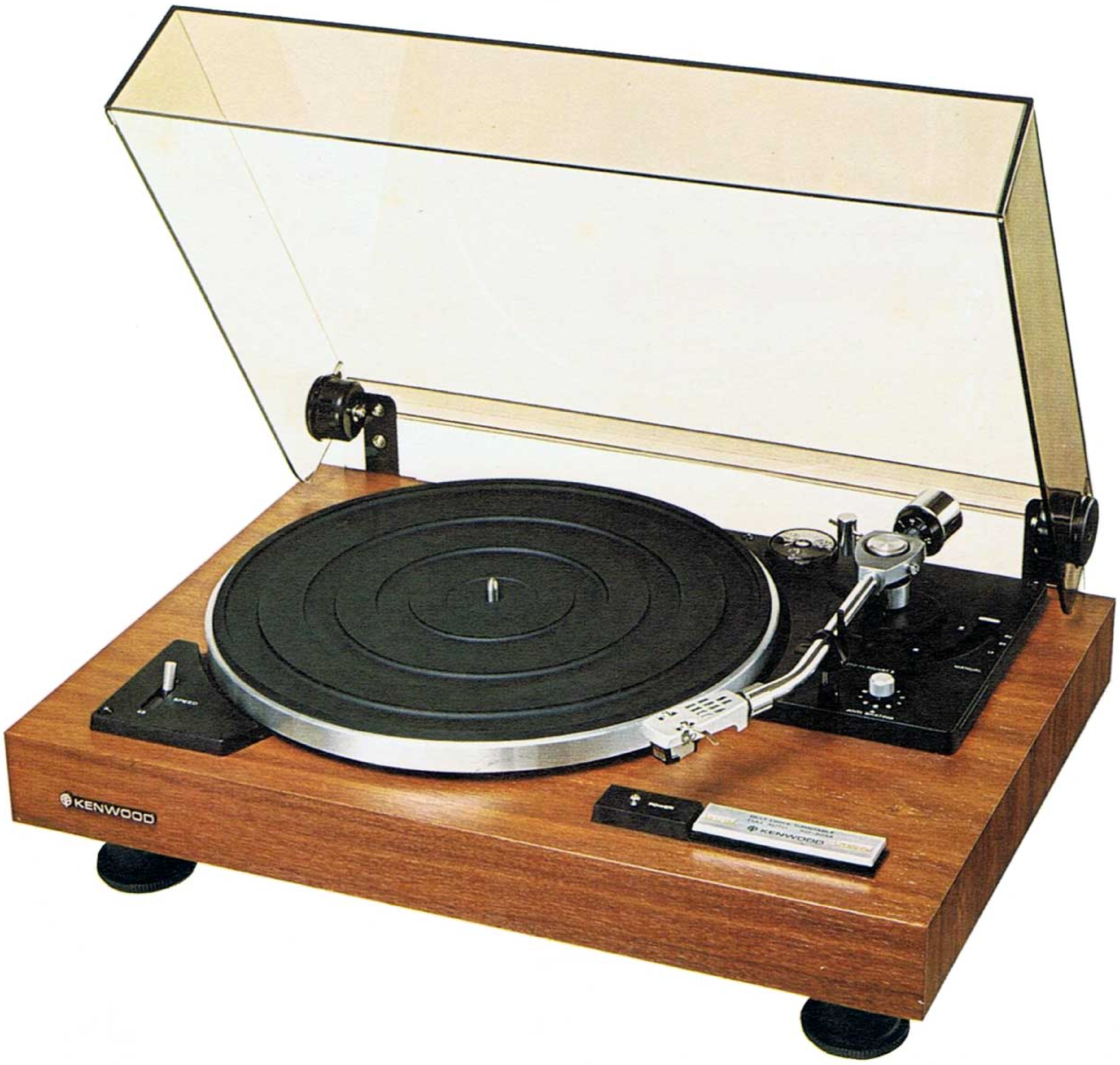

Stylus tip
Skating force
Disc record
Left channel
Right channel
Tracking force reduced because of skating force
Tracking force increased because of skating force
Tracking force

To cancel out this inside force and provide stable, skate-free tracking, the tonearm fitted on the KD–3033 has a coil spring anti-skating device, while the KD–2033 has a suspended weight type anti-skating device.

Cartridge V-39 MK II



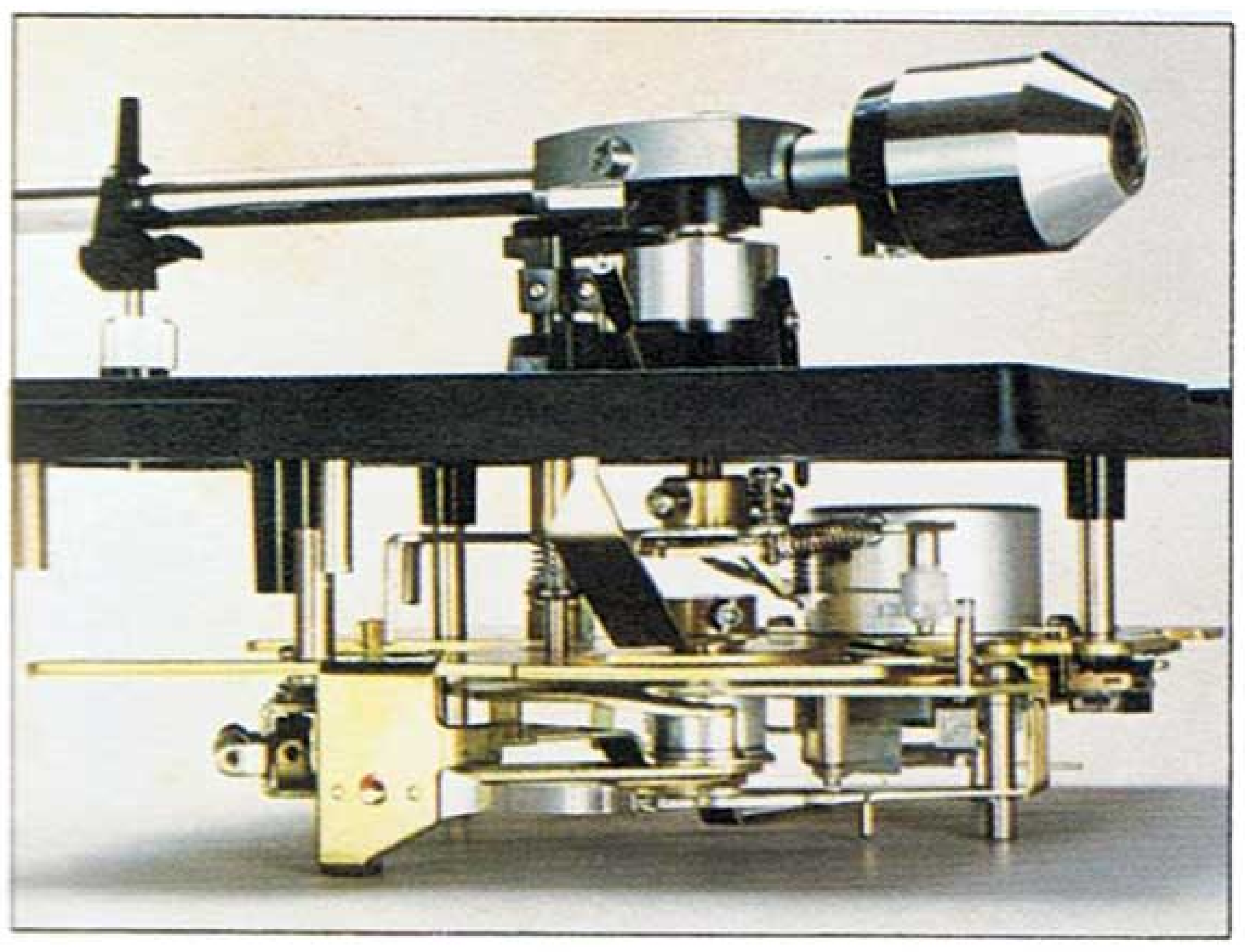
The KD–3033/2033 is fitted with a newly developed moving magnet type cartridge designed especially for the tonearm used. Fitted with a precision polished diamond stylus, it features extremely light and low mass moving elements and outstanding compliance for excellent tracking, to enable the use of extremely low tracking force, for superb tonal quality with minimal wear of both stylus and record.



KD-3033

Fully automatic mechanism with independent geared motor.

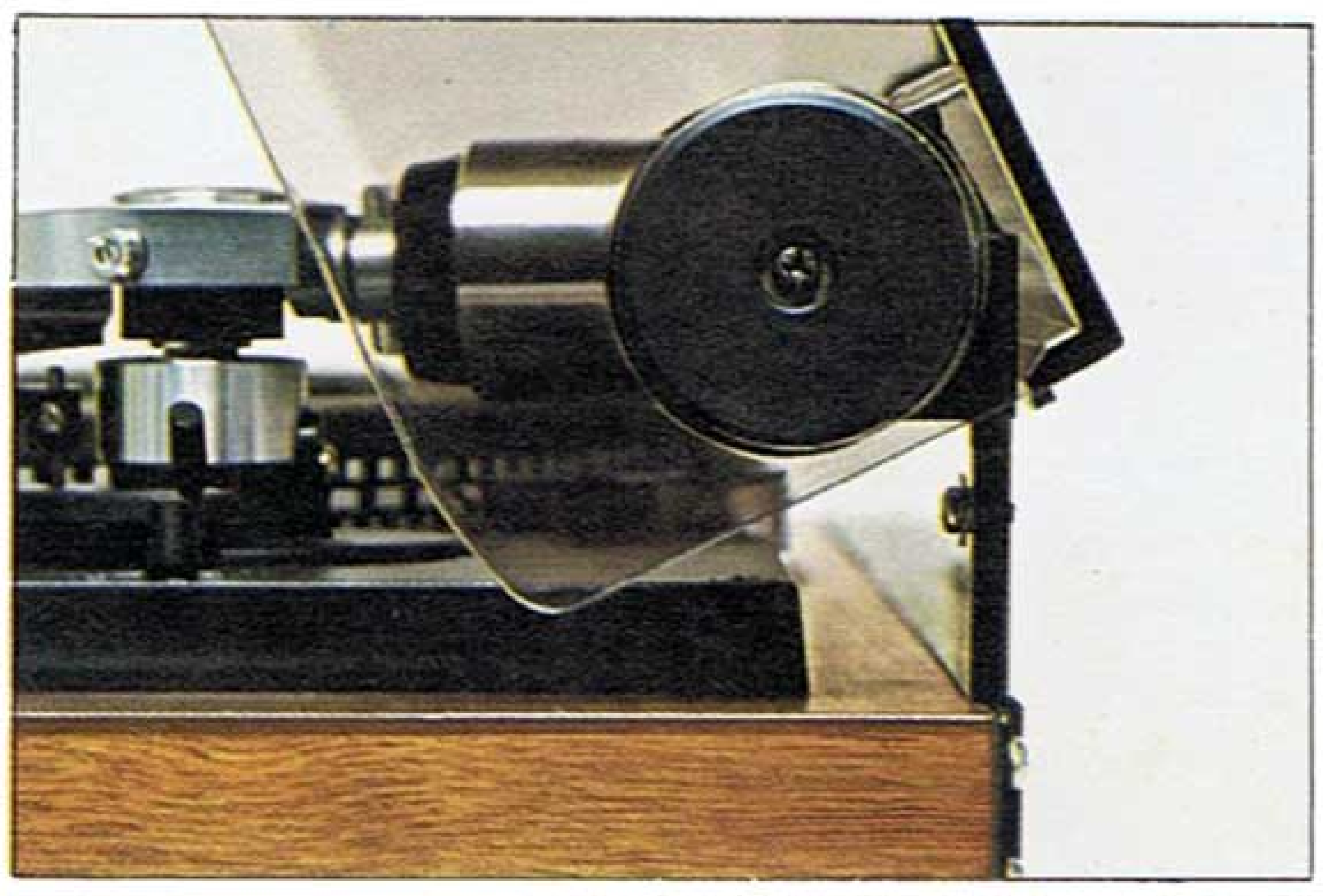
The KD–3033 has a fully automatic mechanism featuring an exclusive Kenwood design which carries out automatic lead-in of the stylus, automatic cutting, automatic return, automatic repeating when desired, and automatic stopping of the motor. A disc size selector is provided to supplement these functions.



The automatic mechanism is activated by a separate motor fully independent of the platter drive motor. This is where the KD–3033 differs basically from conventional automatic turntables in which the functions enumerated above are activated by the platter drive motor, a method that could easily result in increased wow and flutter. Joint use of the drive motor for the automatic functions is also unsatisfactory from the standpoint of the possibility of noise being generated by the gearing, cams, or linkage used. For these reasons, Kenwood developed the automatic mechanism used in the KD–3033 (and its big brother, the KD–5033) in which the platter drive motor and the automatic functions motor are completely independent of each other, and in which the automatic functions motor does not affect the platter drive mechanism at all. The automatic functions motor is a 24–pole synchronous motor featuring quiet, vibration-free operation.

It is a full five years since Kenwood developed the prototype of this automatic mechanism. It is thus a fully tested and proven system, refined to the nth degree, from which all possible bugs have been eliminated, and as such, provides truly stable performance. Thus, the popular notion that automatic mechanisms are not fully dependable does not apply to Kenwood's automatic mechanism.

New hinged dust cover



If a turntable with a conventional cover is placed right up against a wall, when the cover is raised, the rear of the cover will strike the wall surface, to prevent the cover from being raised fully. Accordingly, with such turntables, it is necessary to move the turntable forward and allow space behind the base to facilitate raising the cover.

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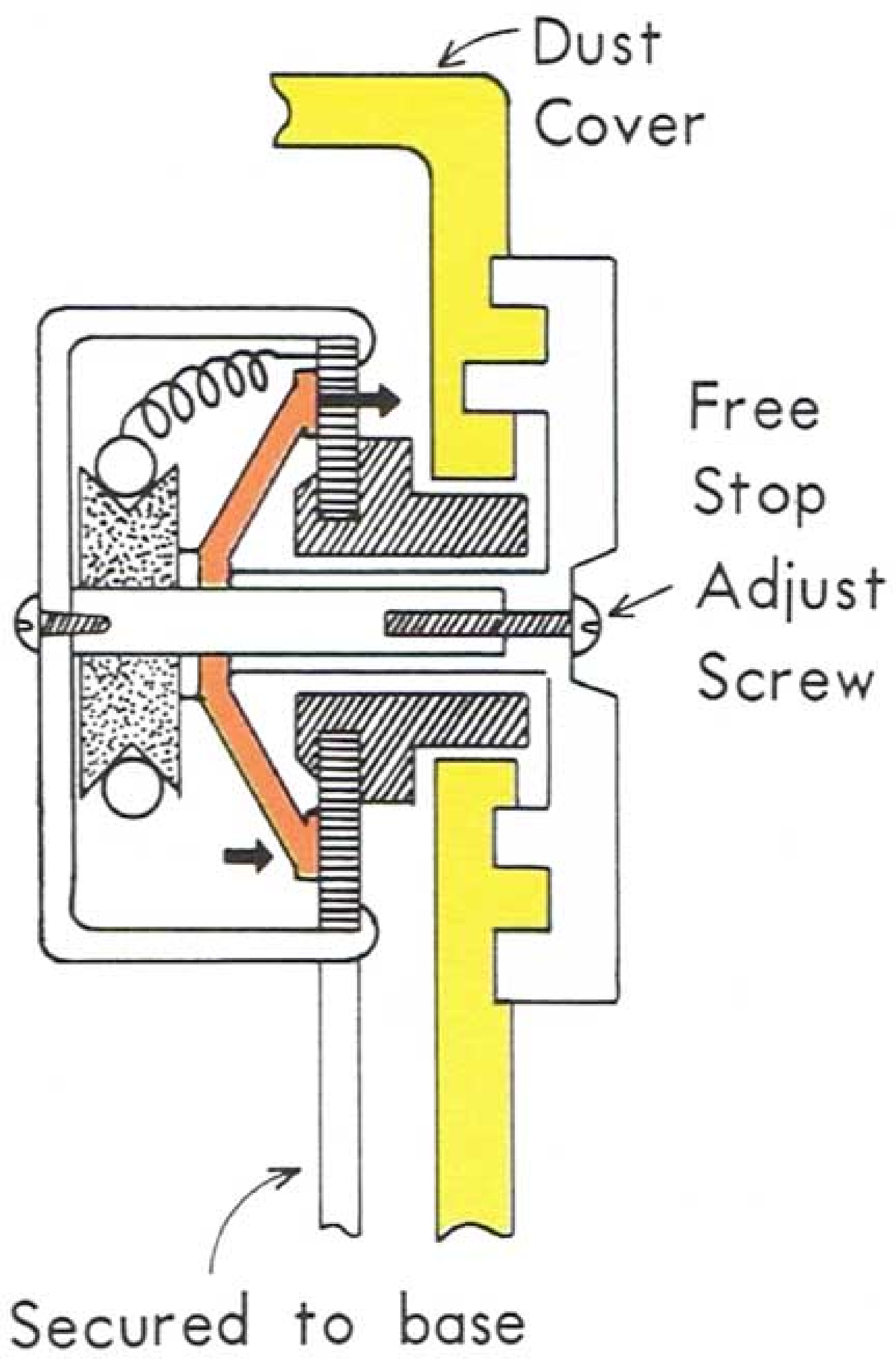

To remedy this, Kenwood has designed a new hinge for the cover which enables it to be raised without its rear overhanging beyond the base when raised, thus meaning that less space is required. Another feature of the new hinge is the fact that it will stay at whatever position it is stopped at.

KD-2033

While employing essentially the same turntable drive system, platter, tonearm and cartridge, the KD–2033 is fitted with a semi-automatic mechanism which provides automatic return and automatic cut, plus a pause function. Therefore, in terms of performance it provides similarly low wow and flutter ratings, the same outstanding tonal quality, and freedom from acoustic feedback.

Auto return

The automatic return mechanism of the KD–2033 lifts the tonearm from the record when the record comes to an end, returns it to the tonearm rest, and brings the turntable motor to a halt. In conventional turntables, this function is accomplished by gearing using the turntable drive. However, this method has a number of inherent defects: the tonearm return speed will vary according to the rpms the turntable is being operated at; if the tonearm is touched while in the return cycle, it is susceptible to damage; and there is the risk of deterioration of the signal-to-noise ratio. However, the automatic return mechanism of the KD–2033 is designed so that it will not malfunction even if the arm is touched while in the return cycle, while the return speed is regulated by a spring and silicon oil and so not only is it unaffected by the rpms of the turntable but it can even be adjusted by varying the tension of the spring.

Auto cut

The automatic cut feature enables stopping the playing of a record, returning of the tonearm to the tonearm rest, and bringing the turntable drive to a halt, by manipulating a lever without touching the tonearm itself.

Pause mechanism

In serious listening, it happens quite often that one wishes to interrupt a record at some point in the middle and to resume playing at precisely the same spot later. In these Kenwood turntables, this is made easy by the pause mechanism. Simply push the pause elevation lever back, and the tonearm will lift off the record and remain hovering above it. Push the lever forward, and it will descend again onto the same spot on the record to resume playing. The elevation mechanism employs a spring and silicon oil damping, and provides smooth lifting and descending of the tonearm.

While silicon oil is a fairly stable substance, its viscosity will still change according to the ambient temperature. An adjustable spring employed contributes to minimize the said change in stability. By incorporating in the mechanism an adjustable spring, the elevation mechanism can be adjusted as needed to provide the optimum descent speeds at all times regardless of season. Refer to Figure 9 for specific details on the mechanism.

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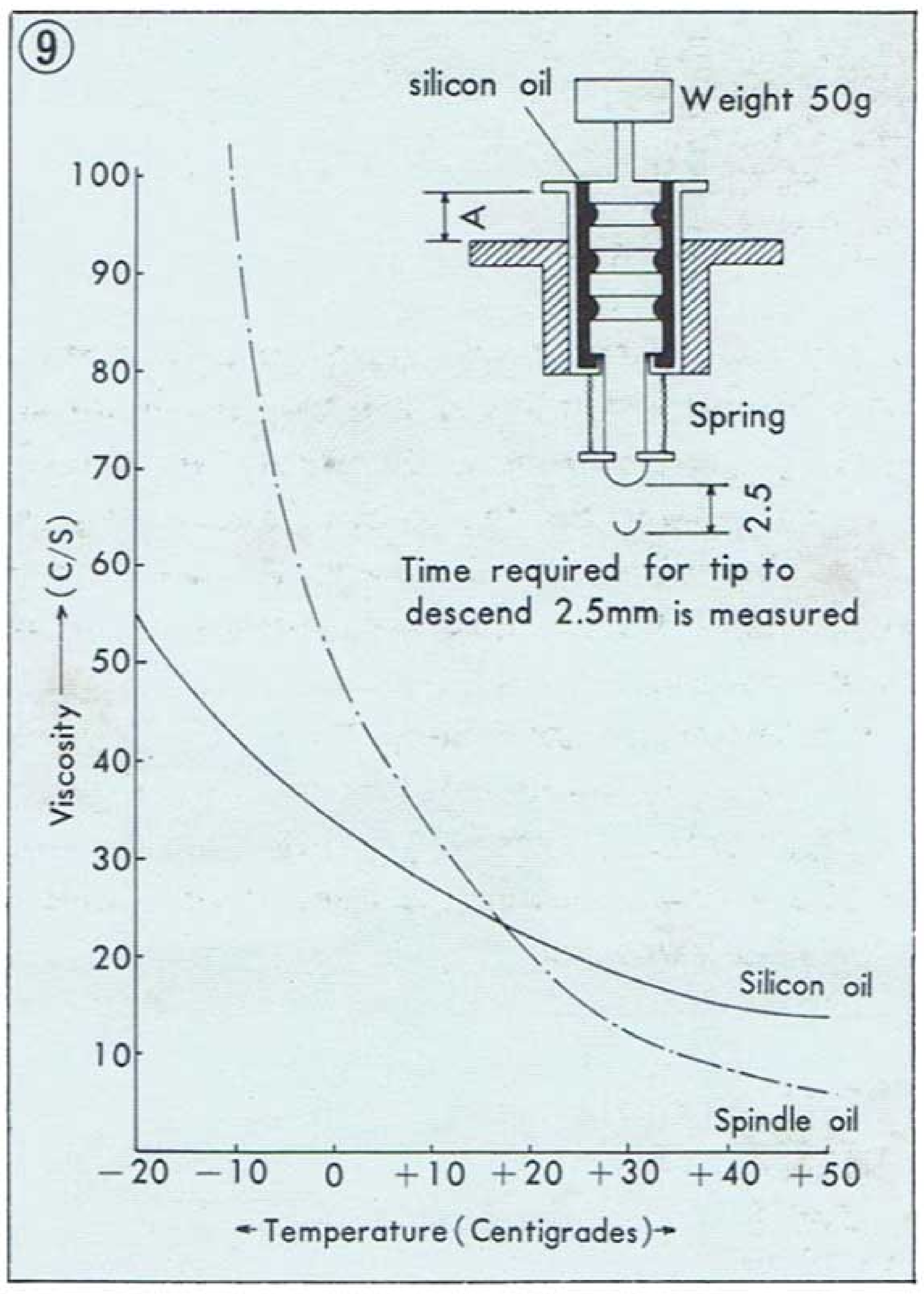

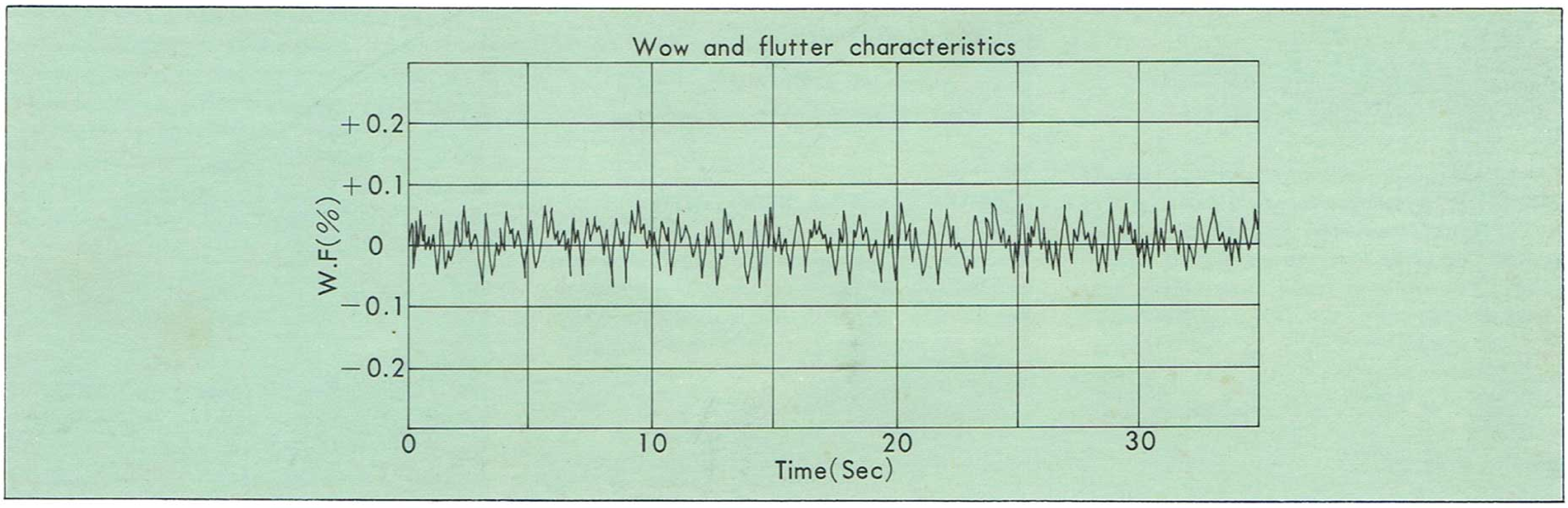

Specifications

	KD-3033	KD-2033
MOTOR and TURNTABLE		
Drive System	Belt Drive System	Belt Drive System
Motors	4 pole Synchronous Motor(for turntable) 24 pole Synchronous Gear Motor(for automatic operation)	4-pole Synchronous Motor
Turntable Platter	12″(30cm) diameter Aluminum Alloy Die-Cast	12″(30cm) diameter Aluminum Alloy Die-Cast
Speeds	2 Speeds, 33-1/3 and 45rpm	2 Speeds, 33-1/3 and 45rpm
Wow and Flutter	Less than 0.06%(WRMS)	Less than 0.06(WRMS)
Signal to Noise Ratio	More than 49dB	More than 49dB
TONEARM		
Type	Static-Balance Type, S-Shaped Pipe Arm with Lateral Balancer EIA Plug-in Connector	Static-Balance Type, S-Shaped Pipe Arm, EIA Plug-in Connector
Effective Arm Length	8-7/16″(215mm)	8-7/16″(215mm)
Over-Hang	3/8″(9.5mm)	3/8″(9.5mm)
Tracking Error	±1.5degree	±1.5degree
Stylus Pressure Range	0 to 4grams	0 to 4grams
Usable Cartridge Weight	4 to 13grams	4 to 10grams
CARTRIDGE		
Type	Moving Magnet Type(V-39 MK II)	Moving Magnet Type(V-39 MK II)
Frequency Response	20—20,000Hz	20—20,000Hz
Channel Separation	More than 25dB(1,000Hz)	More than 25dB(1,000Hz)
Output Voltage	3mV(1,000Hz, 5cm/sec)	3mV(1,000Hz, 5cm/sec)
Output Balance	1.5dB(1,000Hz, 5cm/sec)	1.5dB(1,000Hz, 5cm/sec)
Load Impedance	50Kohms	50Kohms
Stylus	0.5mil diamond	0.5mil diamond
Stylus Pressure	2±0.25grams	2±0.25grams
Compliance	7×10^{-6}cm/dyne	7×10^{-6}cm/dyne
Replacement Stylus	N-39 MK II	N-39 MK II
MISCELLANEOUS		
Power Requirements	AC110-120/220-240V, 50/60Hz	AC110-120/220-240V, 50/60Hz
Power Consumption	14watts	11watts
Dimensions	W18-7/8″(480mm)×D13-3/4″(350mm)×H6-5/8″(168mm)	W18-7/8″(480mm)×D14-7/16″(367mm)×H6-5/8″(168mm)
Weight	15.4lbs(7kg)	13.2lbs(6kg)
ADDITIONAL FEATURES	Auto-In Mechanism Auto-Cut Mechanism Auto-Return Mechanism Auto-Repeat Mechanism Manual Operating Mechanism Disc Size Selector, Pause Elevation, Anti-Skating device Head Shell Stand, Insulator, Free-stop Action Dust Cover Low Capacity Audio Cord with Pin plug, Pilot Lamp	Auto-Return Mechanism Auto-Cut Mechanism Pause Elevation(variable speed) Return Speed Adjusting Mechanism Anti-Skating Device Stylus Pressure Direct-Readout Counter, Insulator, Free-Stop Action Dust Cover
SUPPLIED ACCESSORIES	EP Adaptor, Motor Lubricating Oil. Over-Hang Gauge Motor Pulley and Screw Driver	EP Adaptor, Motor Lubricating oil, Over-Hang Gauge Motor Pulley and Screw Driver

* Any of specifications given here is subject to change without notice.

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